TT FOOD
THINK TANK FOOD

Digital Technologies for Agriculture and Food Security

Documentation of Think Tank Food Events and Presentations 2022-2023

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giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Steinbeis HOCHSCHULE

Business Scouts for Development

zvei electrifying ideas

Forewords

"Digitalization is revolutionising agriculture"

The German Electrical and Electronic Manufacturers' Association (ZVEI) represents the economic, technological and environmental interests of the German electrical industry. With around 900,000 employees nationwide and an industry turnover of around 225 billion euros (2022), the electrical and electronic industry is the second largest industrial sector in Germany after mechanical engineering in terms of the number of employees. The ZVEI consists of 22 product divisions in which the member companies are organized. In addition to a wide range of electrotechnical products, they also manufacture electronic components for the digitalization of agriculture. The innovative strength of the German electrical and mechanical engineering industry has made Germany one of the world's leading nations in the development, production and application of modern agricultural technology.

Electronic components from the German electrical industry
Today, there is hardly an agricultural machine on the market without automated steering systems, data management and documentation electronics. For example, digital GPS receivers, steering aids and guidance systems can automatically steer a tractor to within two centimetres. Intelligent implements for spraying pesticides, sowing seeds or watering crops can be easily coupled and adapt their functions to the speed of the tractor. Software optimizes dosage based on environmental data collected by sensors, ensuring that inputs such as fertilizer are used optimally and waste is minimized.

> **"Today, there is hardly an agricultural machine on the market without automated steering systems, data management and documentation electronics."**

The drones are also equipped with components from the German electrical and digital industry. These can be used to detect plant pests or diseases, calculate harvest forecasts or determine the need for fertilizers and pesticides using multi-spectral cameras and subsequent data analysis. Of course, drones can apply these pesticides with pinpoint accuracy and in the exact amount needed.

Smart farming also involves the integration of information and communication technologies in agriculture, because the big challenge is to network intelligent agricultural machines and to use

the data they collect about the condition of the soil and plants, the climate or even the use of inputs in a targeted way. Among other things, smart farming involves connecting agricultural machinery and vehicles to the Internet of Things (IoT). Experts therefore speak of Agriculture 4.0 in relation to Industry 4.0.

"The challenge is to network intelligent agricultural machines and to use the data they collect ."

Precision and smart farming are not only benefiting crops; autonomous systems and robots are no longer an exception in stables and pastures. Automated milking systems are already in use on many dairy farms in Germany. Cows walk autonomously to one of the milking stations and are identified by a collar: The milking system recognizes the animal and initiates an individual milking process, taking into account the amount of feed and the height of the teats on the udder.

Weather is one of the most important factors in farming. A region's climate determines which crops can be grown and which animals can be raised. By combining sensor data on soil conditions, water availability or weather, the use of seeds, feed, irrigation and other inputs can be precisely calculated and optimised.

But smart farming also has its risks. Anyone involved in IT security knows that smart often means vulnerable. The more

complex a smart system is, the more potential points of attack there are for hackers, and this can have serious consequences for operational safety. A lot of damage can be done with large robots in the field, and animal welfare would also be at risk if smart feeding systems were hacked. Pesticide manufacturers, for example, could use the data to see that their product is about to be in high demand and raise prices on the fly.

Experts believe that the limits of what is possible are far from being reached. Sensors are becoming more sensitive, smaller and, above all, cheaper. The introduction of the 5G and, in the future, 6G mobile phone standards will open up new networking opportunities for farmers and their businesses.

"Digitalization has triggered major changes in modern agriculture and improves food security around the world."

Digitalization has triggered major changes in modern agriculture and improves food security around the world. ZVEI member companies contribute to the digitalization of modern agriculture by developing and optimising electronic components. Technological innovations from ZVEI members thus support global efforts to secure food supplies, not least in the interests of sustainable climate protection and resource conservation worldwide. Against this background, the concept of the Think Tank Food was developed together with Steinbeis University and successfully implemented at the end of 2021.

Johannes Kirsch
Senior Director at ZVEI International Trade and Future markets

John U. Fimpel (GIZ)
Business Scout for Development, seconded to ZVEI on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ)

zvei
electrifying ideas

Business Scouts for Development

"African agriculture has a lot to gain from digitalization"

Despite having a quarter of the world's arable land, sub-Saharan Africa produces only 10% of the world's agricultural output. African agriculture faces several challenges, several interventions are focused on building sustainable agri-food production systems, ensuring efficient and equitable food and nutrition systems, fostering climate action and sustainable natural resources management, and building resilience and ending poverty. Millions of smallholders are impacted by the lack of access to quality inputs, limited access to financing, poor infrastructure, low productivity levels, and lack of market access.

"Can emerging technologies and digitalization help improve livelihoods?"

Can the utilization of emerging technologies, capacity building all across the value chains and digitalization help address some of these challenges and improve their livelihoods? We observe from a number of countries that good, real-time data combined with intelligent analytics and business processes are transforming several sectors, and agriculture is also one of them.

The need for having a comprehensive policy and road map for digitization is paramount. Digitalization is a multi-stakeholder, inter-ministerial effort and is the first step to the digitization of agricultural value chains, actors, and their transactions.

Investing in improving and strengthening basic building blocks such as literacy, digital literacy, and connectivity together with addressing and bridging the digital gender gap will help build a more resilient society that can leverage the advantages of digitalization and use it to improve their livelihoods.

Women play a major role in agriculture and it is important to develop and promote gender-sensitive policies, technologies, and interventions. Focus should also be on collecting good quality data that could help build and deliver services, facilitate sustainable partnerships between the private and public sectors as well as in facilitating data-driven policies/interventions.

> **"Women play a major role in agriculture. It is important to develop gender-sensitive policies and technologies."**

Unleashing the potential of youth and their power to transform agriculture in Africa through the use of emerging technologies and innovative processes through the facilitation of creating rural entrepreneurs will help bring smallholders together to create a community (in situations where creating an FPO or cooperative is not feasible) where they could access better inputs, both in terms of quality and cost, avail of microfinance and loans as well as being able to combine their products to access better markets and command a higher value for their produce.

The availability of high-resolution satellite imagery, low-cost weather stations, low-cost sensors, and emerging business models makes it feasible to provide smallholders with personalized, real-time, and actionable advisories through various delivery mediums to the extent possible. Value-chain transactions can be tracked and digitized, which makes it easier to identify creditworthiness and to be able to deliver financial services. African agriculture has a lot to gain from digitalization. Partnerships are essential, investments are needed to solve critical bottlenecks, basic building blocks must be strengthened and capacities built all through the value chains will help unlock the enormous potential that African agriculture holds.

Gerard Sylvester
Investment Officer
(Digital Agriculture)

Food and Agriculture Organization of the United Nations

www.fao.org
Gerard.Sylvester@fao.org

Introduction

TT-Food is organizing online events on digital key technologies and their application. The platform enables a sustainable network on agricultural digital technologies in Morocco and Sub-Saharan countries.

Challenge and Idea

The application of digital technologies and the extensive use of digital data has important impacts on agriculture, environmental conditions, and socio-economic systems worldwide. Due to the digital transformation, the participation of private and public companies as well as of other stakeholders along the value chain is fundamentally changing. Sustainable actions and programs are required to secure benefits for societies and the environment and simultaneously to minimize risks. Stakeholders' competencies in applying digital technologies at all stages of the value chain are an essential prerequisite, and they need to be supplied with sustainable and feasible plans for implementation.

Against this background, the project "Think Tank Food (TT-Food)", led by Steinbeis University in cooperation and financed by the Business Scouts for Development programme on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), addresses stakeholders from universities and research institutes in agriculture from the partner countries Morocco, Senegal, Cote d'Ivoire, Ghana and Cameroon.

The TT-Food is organizing expert seminars on digital key technologies, and develops and supports the implementation of innovation projects. A virtual discussion platform, established by TT-Food, organizes the continuous exchange between seminar participants, and develops a permanent network on agricultural digital technologies in Morocco and Sub-Saharan countries.

Objectives

TT-Food is facilitating know-how transfer and discussions on feasible applications of digital technologies in tropical agriculture (i.e., interpretation of satellite images, drones for farmland evaluation, smart fertilizing and pesticide application, digital tools in water management, reduction of post-harvest losses, etc.). The focus is on enabling „self-sufficiency" in food.

Think Tank Food therefore focuses on:

• Informing on digital technologies in the agricultural and food sector (theoretical basics and practical application)
• Creating a network between stakeholders and interest groups on an academic level
• Training of basic and advanced skills required for application of digital technologies
• Discussion of opportunities and risks of digital transformation
• Development of business plans related to digital technologies
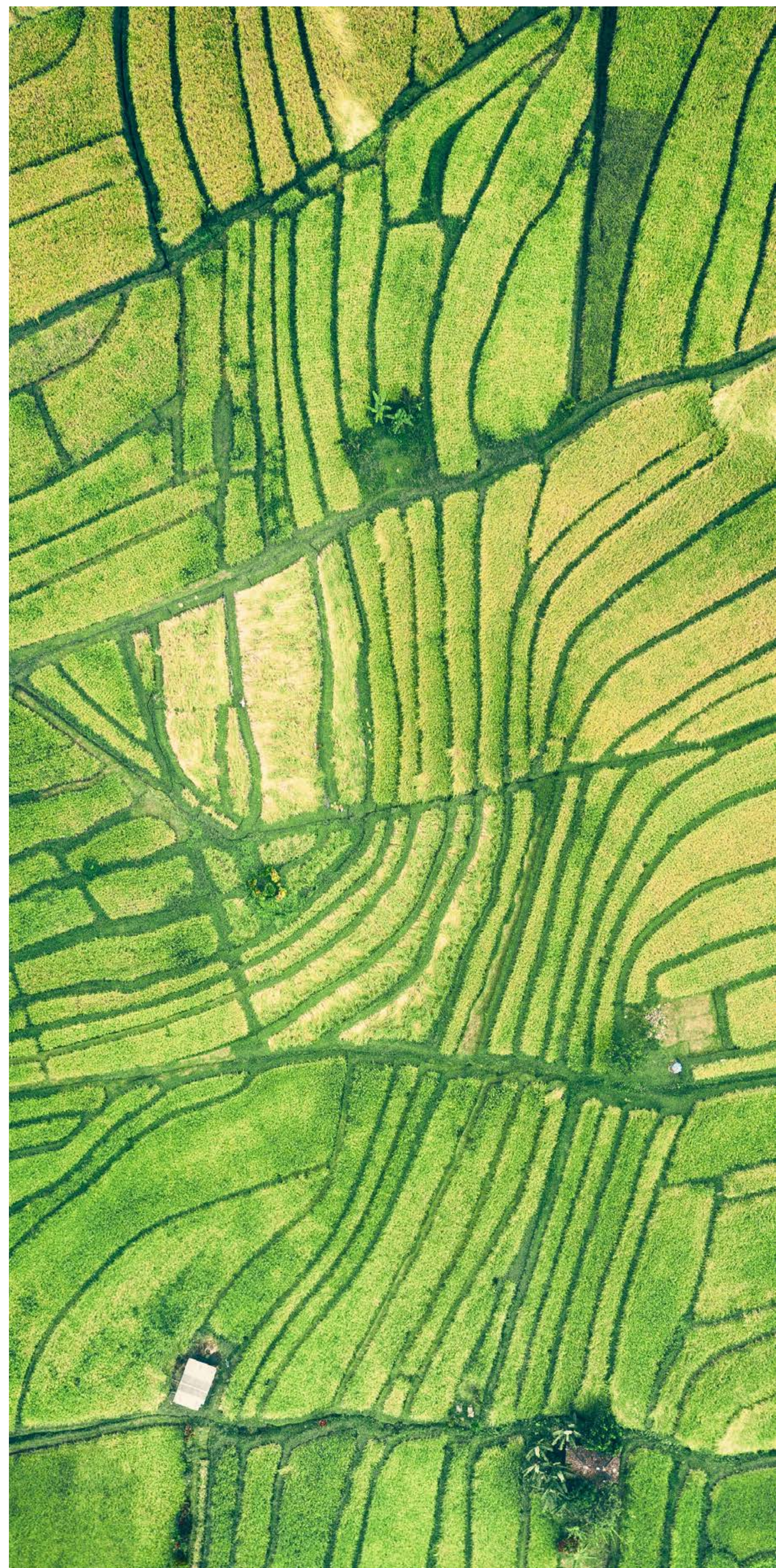
Key Partners & Framework

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

As a service provider in the field of international cooperation for sustainable development and international education work, the GIZ is dedicated to shaping a future worth living around the world. GIZ has over 50 years of experience in a wide variety of areas, including economic development and employment promotion, energy and the environment, and peace and security. The diverse expertise of this federal enterprise is in demand around the globe – from the German Government, European Union institutions, the United Nations, the private sector, and governments of other countries. GIZ works with businesses, civil society actors and research institutions, fostering successful interaction between development policy and other policy fields and areas of activity. The guiding principle is sustainability. The main commissioning party of GIZ is the German Federal Ministry for Economic Cooperation and Development (BMZ).

The commissioning parties and cooperation partners all place their trust in GIZ, who works with them to generate ideas for political, social and economic change, to develop these into concrete plans and to implement them. Since GIZ is a public-benefit federal enterprise, German and European values are central to its work. Together with partners in national governments worldwide and cooperation partners from the worlds of business, research and civil society, GIZ works flexibly to deliver effective solutions that offer people better prospects and sustainably improve their living conditions.

The registered offices of GIZ are in Bonn and Eschborn. In 2021, GIZ generated a business volume of around EUR 3.7 billion. With 24,977 employees, almost 70 per cent of whom are national staff, GIZ works in around 120 countries. As a recognised development service provider, GIZ currently has 431 development workers in action in partner countries. Furthermore, in 2021, the Centre for International Migration and Development (CIM), which is run jointly by GIZ and the German Federal Employment Agency, placed 177 integrated experts and 466 returning experts with local employers in our partner countries, or provided them with financial support, advice or other services.*

*Personnel and business figures as of 31 December 2021

Business Scouts programme

The Business Scouts for Development promote sustainable and responsible engagement by the private sector in around 30 countries across the globe. They are experts for development cooperation who advise companies from Germany, Europe and the project countries on the opportunities for promotion, financing and cooperation available through German and European development cooperation. Furthermore, they facilitate networking with potential partners and, in cooperation with companies, they initiate and design projects and innovative solutions that aim at sustainably advancing a socially just and ecological transformation of the economy. By using private economic resources and entrepreneurial know-how, they not only generate new opportunities for trade but also improve prospects for good jobs and prosperity.

In Germany, the Business Scouts provide advice directly through Germany's top business associations, such as the Association of German Chambers of Commerce and Industry (DIHK), the Federation of German Industries (BDI), the German Confederation of Skilled Crafts (ZDH) and the Federation of German Wholesale and Foreign Trade (BGA), as well as through chambers of commerce and industry, chambers of crafts and trades, industry associations, state-level associations, social partners and – in cooperation with Engagement Global – foundation organisations. In the countries of assignment, they are either integrated into the offices of German development cooperation or work at the Chambers of Commerce Abroad (AHKs) and Delegations of German Industry and Commerce. The experts therefore bridge the gap between the private sector and development cooperation. On the one hand, they contribute to sustainable development in the countries of assignment; on the other hand, they also improve access for German and European companies to

new markets in developing and emerging countries. The programme is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ).

German Electro and Digital Industry Association (ZVEI)

The ZVEI is one of the most important industrial associations in Germany. It represents the interests of a high-tech sector with a very wide and extremely dynamic product portfolio. The ZVEI is committed to the common interests of the electro and digital industry in Germany and at the international level. This commitment is supported by the involvement of around 160 employees in the main office and about 5,000 employees of the member companies in an honorary capacity.

The basis of the association's work is the exchange of experience and views between the members about current technical, economic, legal and socio-political topics in the field of the electrical industry. From this exchange, common positions are drawn up. With proposals on research, technology, environmental protection, education, and science policy, the ZVEI is a pacemaker of technological progress. It supports market-related international standardization work.

Over 1,100 companies have opted for membership of the ZVEI. They employ around 90 percent of the employees and staff of the electrical industry in Germany. Its members include global players, medium-sized and family-owned companies. The sector has 879,000 employees in Germany. In 2021 the turnover was approximately Euro 200 billion.

Steinbeis University

The Steinbeis Network currently encompasses more than 1.000 centers and institutes. Each specializes in a specific field, servicing the requirements of all technical and management disciplines. Most centers are managed and run by university professors who actively embody the Steinbeis principle of merging academic theory and learning with everyday business practice.

The Steinbeis University is a subsidiary of the Steinbeis Foundation for Economic Development. Spanning a worldwide network of specialists and experts, as well as offering training and employee development, the Steinbeis organization provides a variety of services including: consulting and advisory services, research and development support, evaluations and expert reports.

Keynotes

In their presentations, international and local experts provide important impulses on the status and potential of digital technologies in African agriculture.

Keynote Speech 1: Prof. Mohamed Ennaji

PDF: Keynote Speech by Prof. Mohamed Ennaji

Prof. Mohamed Ennaji is a Professor in Mechatronics and Rapid Prototyping at the Ecole Nationale Supérieure d'Arts et Métiers Casablanca of Hassan II University Casablanca, Affiliated Professor in Aeronautics, Aerodynamics and Mechatronics at Mohamed 6 Polytechnic University of Benguerir and Affiliated to the research project „programmable matter and AMF actuators", FEMTO- ST/DISC/OMNI, UMR CNRS 6174, Univ. Bourgogne Franche-Comté, UTBM, France.

Keynote Speech 2: Prof. Rachid Bouabid

Prof. Rachid Bouabid (PhD, PES) is a Professor Researcher at the Department of Soil Science, National School of Agriculture of Meknes, Morocco. Areas of expertise:

- Soil fertility and fertilizer management
- Water use efficiency
- Mapping, GIS and remote sensing
- Precision Agriculture

Keynote Speech 3: Prof. Aziz Abouabdillah

Digital methods for optimizing water use in agriculture

Prof. Aziz Abouabdillah

20 May 2022 - Digital methods for optimizing water use in agriculture

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● *VIDEO: Keynote Speech by Prof. Aziz Abouabdillah*

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Prof. Aziz Abouabdillah is a professor at the National School of Agriculture of Meknes, Morocco. His qualifications include:

- Climate Smart Agriculture, Digital Irrigation, Climate change, Climatology
- Integrated water management, hydrological modeling, Irrigation design, irrigation scheduling, Crop modeling, GIS
- Horticulture, Good Agricultural Practices, Fruit trees production, smart irrigation scheduling, Fertigation scheduling for horticultural crops

Keynote Speech 4: Abdellah Aboudrare, PhD

VIDEO: Keynote Speech by Abdellah Aboudrare
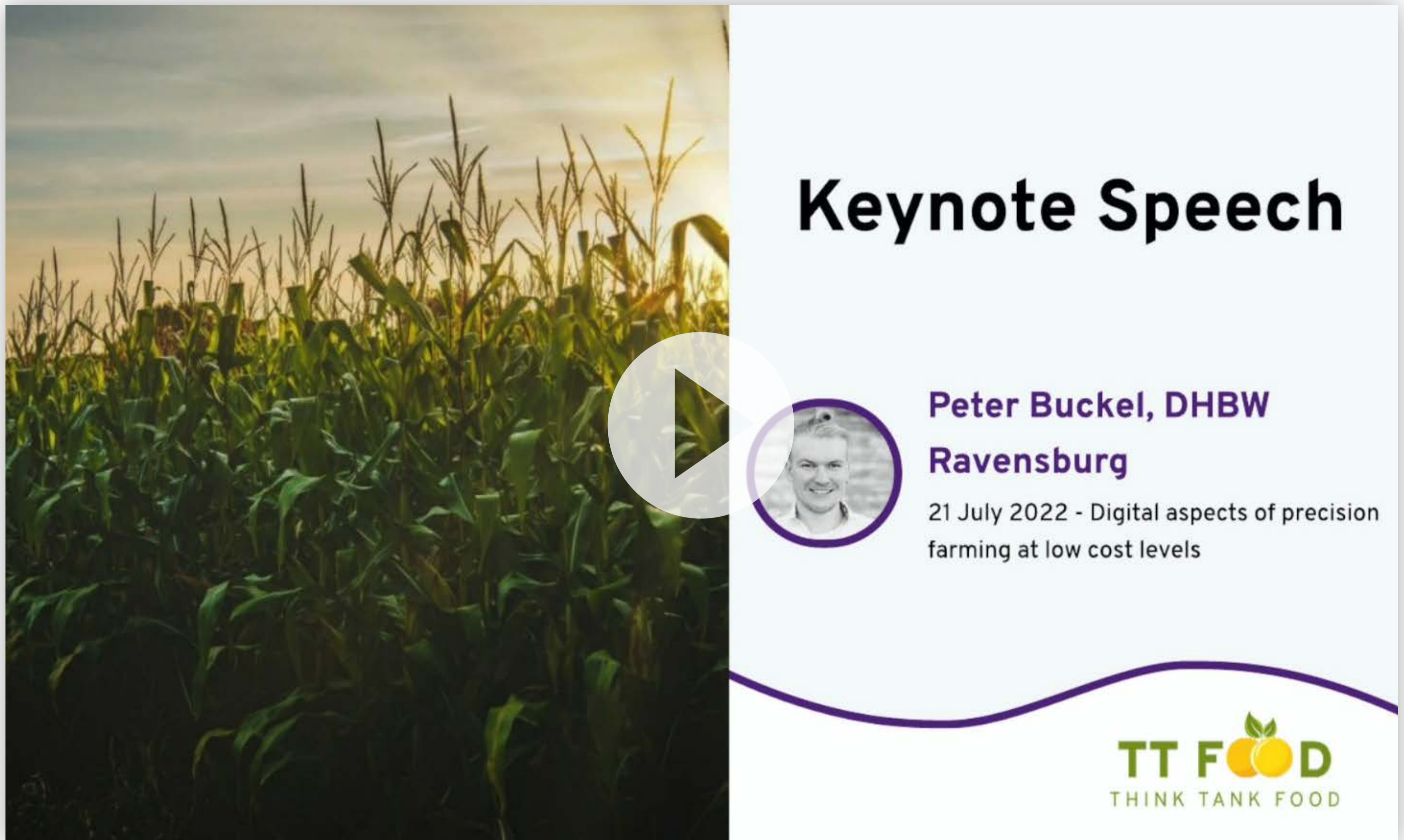
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Abdellah Aboudrare, PhD is a teacher, researcher and training expert at the National School of Agriculture of Meknès (ENA), Morocco.

- 30 years of experience in education, research, training and development in agricultural mechanization, conservation agriculture and soil and water management for a sustainable crop production, mainly in dryland areas and mountainous areas
- PhD, Agricultural Mechanization, Water Management and Crop Productions in Rainfed Areas (IAV Hassan II)

Keynote Speech 5: Peter Buckel

● *VIDEO: Keynote Speech by Peter Buckel*

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Peter Buckel is a research assistant at DHBW Ravensburg, Germany. His current research field is environmental influences on agricultural machinery. Areas of expertise:

· Agriculture
· Computer Vision
· Autonomous Agriculture Machines

Keynote Speech 6: Dr. Andreas Schaeffer
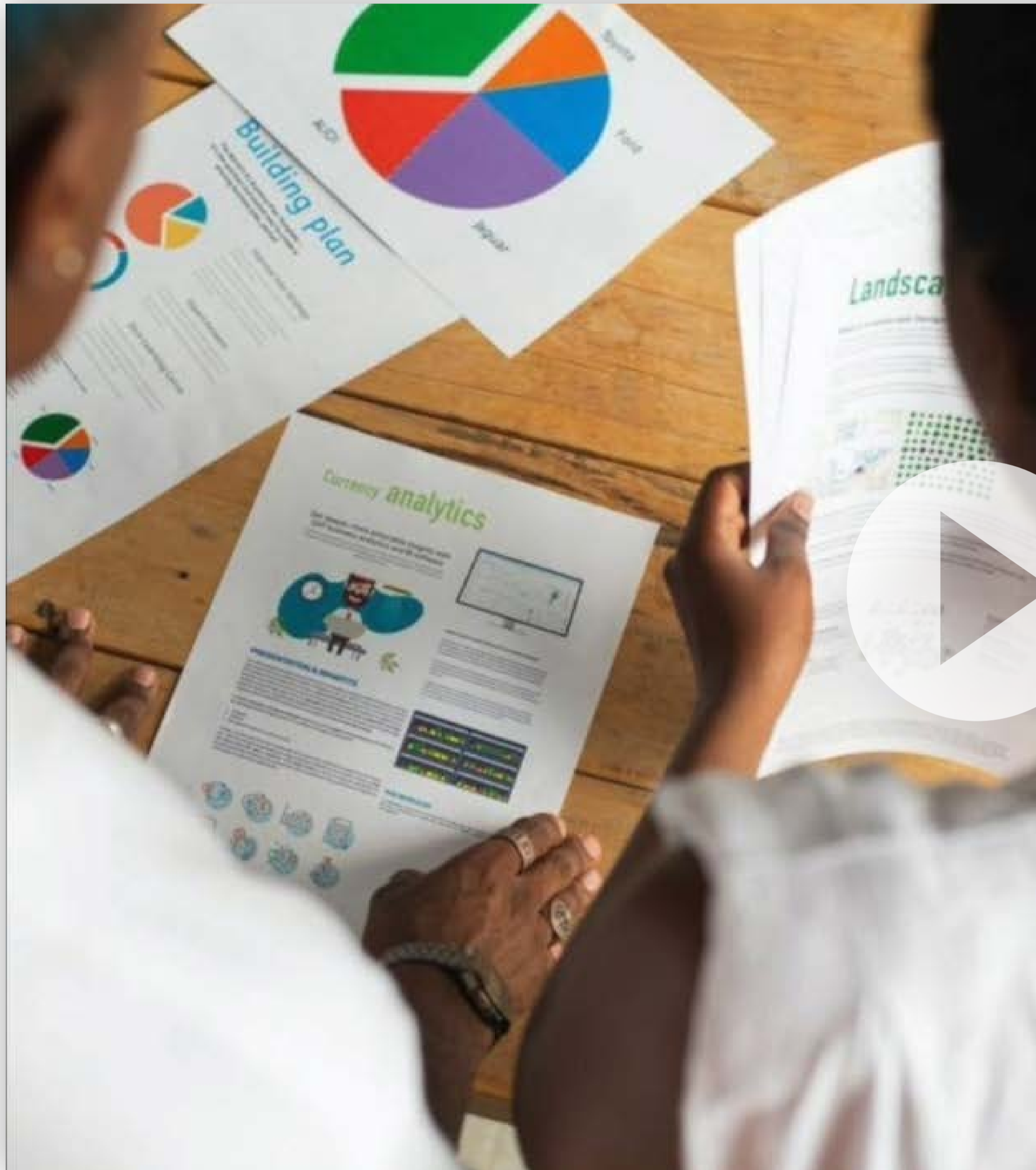
● *VIDEO: Keynote Speech by Dr. Andreas Schaeffer*

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Dr. Andreas Schaeffer is a Professor and institute director at RWTH Aachen University, Germany. His research interests relate to the metabolism of organic xenobiotics, such as pesticides and other chemicals and nano materials in soil, water and sediments, and plants. One focus of research are non extractable residues of chemicals usually lacking information on structure and bioavailability. Another area of interest is testing the effects of 2 pollutants on terrestrial and aquatic organisms. He has published more than 230 ISI cited papers and four text books.

Keynote Speech 7: Sarah Lorenz

○ *VIDEO: Keynote Speech by Sarah Lorenz*

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Sarah Lorenz is the Co-Founder and CEO at Bright&Bold. Her areas of expertise include:

- Expert in innovation design & business development
- In-depth knowledge & many years of experience in corporate innovation for startups, SMEs, DAX corporations, universities & government representatives
- Match Maker & Coach
- International experience in Europe, Latam, Asia & Africa

Keynote Speech 8: Gerard Sylvester

Food Traceability-
Focus on
smallholder
producers

Gerard Sylvester - FAO

15 February 2023 - Dialogue events on exemplary
business models

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● *VIDEO: Keynote Speech by Gerard Sylvester*

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Gerard Sylvester works for the Food and Agriculture Organization of the United Nations (FAO), based in Rome. As the Investment Officer (Digital Agriculture) at the Investment Center Division, he is responsible for designing, supporting the implementation and evaluating of investment operations (projects and programmes) in food security, agriculture, rural development, natural resource management and agroecology, as well as strategic and policy work, with a focus on promoting digital technologies for food system development, natural resource management and climate resilience.

Use Cases

The use cases in the individual thematic areas of TT-Food show the diverse possibilities and experiences in the practical application of digital technologies in agriculture.

Use Case: Use of drones for the exploration of agricultural areas

DRONE 9JA

DRONE 9 JA is offering drone technology to various sectors such as agriculture, construction, real estate, tourism and the oil & gas industry.

Speaker: Foluke Akinbiyi, Sales & Marketing Manager

Ohalo

Ohalo is an archeological site by the Sea of Galilee, an original inspiration for ohalo.io to build an internet of food.

Speaker: Abdelbar Aglagane, Educator, Beekeeper, Tech Wizzard

Alley Capital Group

Alley Capital Group is an award winning enterprise specialising in smart technologies for agriculture, in the field of drone crop spraying.

Speaker: Dr. Piwai Chikasha , Director

DRONE 9JA

Country: Nigeria

DRONE 9JA is one of the leading drone companies in Nigeria. At DRONE 9JA we use the latest and most advanced technology available for drones (unmanned aerial vehicles, UAV systems) to enhance, assist or take charge of your projects.

⤢ Website: www.drone9ja.com

Foluke Akinbiyi,
Sales & Marketing Manager

Political, economic and social challenges of using drones in tropical agriculture.

Ms. Foluke Akinbiyi, Sales & Marketing Manager

Use of drones for the exploration of agricultural areas - 31 March 2022

VIDEO: Presentation by Ms. Foluke Akinbiyi on the challenges of drone usage

Ohalo

Country: Morocco

Ohalo is an archeological site by the Sea of Galilee and is believed to be the first evidence of agriculture activity in our history. We at ohalo.io take inspiration from this scientific revelation, to rethink our current food systems and reinvent how we produce, move, and consume food.

Website: https://medium.com/ohalo-io

⊕ Download Presentation (PDF)

Abdelbar Aglagane, Educator, Beekeeper, Tech Wizzard

Application of blockchain technology for a scalable small scale regenerative agriculture.

Abdelbar Aglagane, Educator, Beekeeper, Tech Wizzard

Use of drones for the exploration of agricultural areas - 31 March 2022

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VIDEO: Presentation by Abdelbar Aglagane on the 'Internet of Food'

Alley Capital Group

Country: Zimbabwe

Alley Capital Group, Simbabwe, specializes in services in drone application, especially drone crop spraying as well as drone survey and mapping. The team comprises Aeronautical Engineers and Academics with international qualifications, training, experience and firm appreciation of drone technology.

Website: www.acg.co.zw

Dr. Piwai Chikasha

Alley Capital Group, Simbabwe, presents their services in drone application, esp. on drone crop spraying as well as drone survey and mapping.

Piwai Chikasha

31 March 2022 - Use of drones for the exploration of agricultural areas

PDF: Presentation by Dr. Piwai Chikasha on their drone application services

Use Case: Satellite-based remote sensing in subtropical and tropical agriculture

FAO

The Food and Agriculture Organization (FAO) aims to achieve food security for all and makes sure that people have regular access to enough high-quality food to lead active, healthy lives.

Speaker: Keith Cressman, Senior Locust Forecasting Officer at the UN FAO

SOWIT

SOWIT is a data company living at the crossroads of remote sensing, AI and agronomy, whose goal is to build products that are fitted to serve the African smallholder farmers.

Speaker: Hamza Bendahou, Co-Founder

Victor Hertel

Victor Hertel works as a Doctoral Researcher at the German Aerospace Center (DLR) and works on satellite-based flood extent mapping.

Speaker: Victor Hertel

Food and Agriculture Organization of the United Nations (FAO)

Country: Italy

FAO is a specialized agency of the United Nations that leads international efforts to defeat hunger. Keith Cressman has been operating the Organization's global Desert Locust monitoring and early warning system and has been providing forecasts to countries for the past 35 years.

Website: www.fao.org/home/en/

⬇ Download Presentation (PDF)

Keith Cressman, Senior Locust Forecasting Officer at the Food and Agriculture Organization of the United Nations (UN FAO)

Brief overview of the Desert Locust threat and the use of satellite imagery for forecasting locusts and its role in the global early

Keith Cressman - FAO

12 May 2022 - Satellite-based remote sensing data

VIDEO: Presentation by Keith Cressman on the Desert Locust threat

SOWIT

Countries: France, Morocco, Senegal, Tunisia

With their solutions, SOWIT aims to help farmers better understand their lands through active fertilization, irrigation & harvest management. Their mobile application provides a free and user-friendly environment where satellite data is turned into simple maps showing the farms' water stress and biomass content.

☐ Website: www.sowit.fr

⬇ Download Presentation (PDF)

Hamza Bendahou, Co-Founder

Software solution - Bringing a competitive edge to farmers using satellite data

Mr. Hamza Bendahou, Co-Founder - SOWIT

12 May 2022 - Satellite-based remote sensing data

VIDEO: Presentation by Hamza Bendahou on the benefits of satellite data

Victor Hertel

Country: Germany

Victor Hertel has a Master of Science in Aerospace Engineering and works as a Doctoral Researcher at the German Aerospace Center (DLR).

🡥 LinkedIn Profile

⬇ Download Presentation (PDF)

Victor Hertel

VIDEO: Presentation by Victor Hertel on satellite-based remote sensing

Use Cases: Digital methods for optimizing water use in agriculture

eLEAF

eLEAF is a Dutch Earth Observation company providing satellite-based data and services to optimise agricultural production, support sustainable water management, and to assess climate risk and provide crop index insurance solutions.

Speaker: Annemarie Klaasse, Senior Project Manager

CMGP.CAS

CMGP.CAS is a leading actor in Morocco in irrigation, agricultural supplies, solar energy and water infrastructure.

Speaker: Mohammed El Mankiby, Technical Engineer

UDS - University for Development Studies

UDS is Ghana's first public University in the North. The pedagogical philosophy of UDS stems from a new thinking in higher education.

Speaker: Richard Kwame Dogbey, Assistant Lecturer

CyberLeet

Cyberleet is a Startup specialized in IoT based water control & monitor systems for applications in smart cities/farms.

Speaker: Mohamed Elaouad, Product Architect & CEO

eLEAF

Country: The Netherlands, founded in 2000

eLEAF produces evapotranspiration and bio-mass production data, from continental to field scale to improve sustainable crop production, water- and irrigation management, and the management of drought and climate risk for growers and agri-businesses.

Website: https://eleaf.com/

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Annemarie Klaasse
Senior Project Manager

Monitoring of agricultural water use in Morocco

Ms. Annemarie Klaasse, Senior Project Manager - ELEAF

20 May 2022 - Digital methods for optimizing water use in agriculture

VIDEO: Presentation by Annemarie Klaasse on the monitoring of water use

CMGP.CAS

Country: Morocco, Senegal, Ivory Coast, founded in 1995

CMGP.CAS (CMGP Group) is the regional leader in the manufacturing, distribution and integration of irrigation systems, agricultural inputs and infrastructure equipment.

Website: https://cmgp-cas.com/en/home-page-en/

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Mohammed El Mankiby
Technical Engineer

VIDEO: Presentation by Mohammed El Mankiby on efficient irrigation

UDS - University for Development Studies

Country: Ghana, founded on 15th May, 1992

The University has a pro-poor focus with a specific emphasis on practically-oriented, re-search and field-based training that is aimed at contributing towards poverty reduction in order to accelerate national development.

Website: https://www.uds.edu.gh/

Richard Kwame Dogbey,
Assistant Lecturer

Hydro-climate information services in Ghana

Mr. Richard Dogbey - UNIVERSITY FOR DEVELOPMENT STUDIES (UDS)

20 May 2022 - Digital methods for optimizing water use in agriculture

PDF: Presentation by Richard Kwame Dogbey on hydro-climate information services

Cyberleet

Country: Morocco, founded in 2020

Cyberleet helps farmers to integrate a fully automated irrigation system that provides re-al-time data and control over the water con-sumption from home.

☑ LinkedIn: Cyberleet Company Profile

Mohamed Elaouad
Product Architect & CEO

PDF: Presentation by Mohamed Elaouad on digital water use optimization

Use Cases: Digital, technical and organizational methods for reduction of post-harvest losses

Kitovo

Kitovu Technology Company is an ag-tech company that builds climate smart farm and post-harvest infrastructure for African agriculture to enable smallholder farmers to optimize their productivity and increase their incomes.

Speaker: Nwachinemere Emeka, Founder and CEO

Sesi Technologies

Sesi Technologies develops affordable technologies to help African farmers and agribusinesses increase productivity and reduce losses.

Speaker: Isaac Sesi, Founder and CEO

KITOVU

Country: Nigeria

Kitovu's technology enables smallholder farmers to take out the guesswork from their operational decision-making, grow the right farm produce for the right market, and access markets, storage, and finance, without any requirement for any upfront investment or financial commitment.

Website: https://kitovu.com.ng

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Nwachinemere Emeka,
Founder/CEO

VIDEO: Presentation by Nwachinemere Emeka on data and storage as a service

Sesi Technologies

Country: Ghana, founded 2018

Sesi Technologies is made up of young people from diverse fields, working together to create and live in a world where poverty and hunger does not exist. They provide technology solutions to help African farmers and agribusinesses maximize pro-ductivity, reduce losses and increase their income.

Website: https://sesitechnologies.com

Download Presentation (PDF)

Isaac Sesi,
Founder and CEO

Delivering Impactful Digital Post-harvest Solutions

Mr. Isaac Sesi, Founder and CEO

6 July 2022 - Digital, technical and organizational methods for reduction of post-harvest losses

VIDEO: Presentation by Isaac Sesi on the impact of digital post-harvest solutions

Use Cases: Digital aspects of precision farming at low cost levels

Graviton Solutions

Graviton Solutions offers its partners a cloud solution based on telematics and IOT that supports farmers in the management of their farms.

Speaker: Rafie Mardaoui, CEO & Hassan Laamel

Agricolus

Agricolus platform is composed of the best technologies for agriculture that allow farmers to manager their farm efficiently according to sustainability goals.

Speaker: Ana Sancho, International Business Development & Matteo Cardinali, Project Manager

GeoPard Agriculture

GeoPard software enables the implementation of precision agriculture for ag consulting companies, ag retail, ag equipment, and ag input enterprises with simple automated tools for complex data.

Speaker: Dmitry Dementiev, Co-Founder & CEO

Graviton Solutions

Country: Morocco

Graviton Solutions develops a modular application architecture: Tracagri is an IoT solution that can gather real-time data to help farmers increase productivity by remotely collecting data on their terrain and machines to maximize productivity and crop yield in any market.

Website: https://graviton.ma

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Rafie Mardaoui, CEO
& Hassan Laamel

Optimize costs and improve productivity with Tracagri

Mr. Rafie Mardaoui, CEO &
Mr. Hassan Laamel

21 July 2022 - Digital aspects of precision farming at low cost levels

VIDEO: Presentation by Rafie Mardaoui & Hassan Laamel on the IoT solution 'Tracagri'

Agricolus

Country: Italy, founded in 2017

Agricolus is a startup in the Smart Farming sector. It aims to support farmers in simplifying and enhancing operations in the field through innovative technologies and Decision Support System. Their goal is to make agritech sustainable by offering integrated platforms and scalable ecosystems.

Website: www.agricolus.com/en/

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Ana Sancho, International Business Development & Matteo Cardinali, Project Manager

Introduction to Agricolus' scalable ecosystems

Ms. Ana Sancho, International Business Development & Mr. Matteo Cardinali, Project Manager

21 July 2022 - Digital aspects of precision farming at low cost levels

VIDEO: Presentation by Ana Sancho & Matteo Cardinali on scalable ecosystems

GeoPard Agriculture

Country: Germany

GeoPard Agriculture is a cloud-based powerhouse for precision Ag data analysis, prescriptions creation, and smart scouting. The GeoPard engine processes satellite imagery, soil sampling, yield, high-density soil scanners, and topography data, building sophisticated multi-layer and 3d models.

Dmitry Dementiev,
Co-Founder & CEO

Website: https://geopard.tech/

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VIDEO: Presentation by Dmitry Dementiev on multi-year and multi-layer analytics

Use Cases: Digital means for efficient and safe handling of agro-chemicals

SKT Aeroshutter

SKT Aeroshutter (SKT) is a technology-based service company which specializes in aerial data collection, analysis and recommendations through Machine learning and Artificial Intelligence.

Speaker: Francis Owusu, Group CEO

Agrix Tech

AgrixTech is a technology company based in Yaounde, Cameroon, that helps small-scale farmers to transition from subsistence farming to commercial farming and maximize their profit.

Speaker: Adamou Nchange Kouotou, CEO & Founder

Integrated Aerial Precision

IAPrecision is the first-of-its-kind agricultural industry-focused drone technology and data analytics service enterprise in Nigeria.

Speaker: Femi Adekoya, Agricultural Drone Specialist

Use Cases: Digital means for efficient and safe handling of agro-chemicals

Agape Innovations Limited

Agape Innovations Limited is changing Africa's agri-culture through introducing novel agro-input tech-nologies, adding value onto indigenous vegetable seeds, solving household pest problems and Using ICT packages to solve various farming problems.

Speaker: Paul Mugisha, Founder/CEO

AGRITEK

AGRITEK Consulting is the first Cameroonian con-sultancy firm accredited in food safety.

Speaker: Guy Bertrand Pouokam, Promoter AGRITEK Lab and CEO of AGRITEK Consulting

Mavuno Technologies GmbH

Mavuno is an Agri & FinTech startup empowering African smallholder farmers with satellite imagery and machine learning: with their subscription for pre-financed farm inputs and services, farmers can double their harvest yields.

Speaker: Johannes Röhrenbach, Co-founder & CEO

SKT Aeroshutter

Country: Ghana (headquarter), Cote d'Ivoire, Senegal, France and Netherlands

SKT Aeroshutter is a licensed drone operator which specializes in Aerial Data Collection, Precision Agriculture, Artificial Intelligence and Geographic Information System. They develop and re-design Unmanned Aerial Vehicles for specific applications dedicated to the African market.

Website: https://sktaeroshutter.com

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Francis Owusu, Group CEO
SKT Aeroshutter LTD

VIDEO: Presentation by Francis Owusu on bringing AI and Agriculture together

Agrix Tech

Country: Cameroon

Agrix Tech bundles and provides to farmers everything they need: financing, farm inputs, advice, insurance and market access. They use machine learning and satellite data to enable better credit decisions, and automated operations keep costs low and processes scalable.

Website: www.agrixtech.com

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Adamou Nchange Kouotou,
CEO & Founder

A digital tool to detect and control crop disease made to empower small-scale farmers in Africa.

Adamou Nchange Kouotou, CEO & Founder

7 September 2022 - Digital means for efficient and safe handling of agro-chemicals

TT FOOD
THINK TANK FOOD

VIDEO: Presentation by Adamou Nchange Kouotou on managing crop disease digitally

Integrated Aerial Precision

Country: Nigeria

IAPrecision aims to empower farmers in impro-
ving their farm efficiency, increase harvest yi-
eld for profitability and reduce operational cost
through drone-powered solutions, i.e. precision
drone spraying, drone-based crop scouting, crop
health monitoring and assessment, targeted drone
broadcasting operation amongst others.

Website: https://iaprecision.com

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**Femi Adekoya,
Agricultural Drone Specialist**

VIDEO: Presentation by Femi Adekoya on practical use cases of drones

Agape Innovations Limited

Country: Uganda

Agape Innovations Limited focuses on enhancing profitability for farmers in Africa. They provide tailored and affordable ICT solutions for scaling and bundling agric info, technology adoption and research for small and large scale farmers.

Website: www.agapeinnovations.com

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Paul Mugisha,
Founder/CEO

VIDEO: Presentation by Paul Mugisha on ICT to provide crop protection alternatives

AGRITEK

Country: Cameroon

AGRITEK Consulting's mission is to contribute to the formal marketing of agricultural and agri-food products "Made in Africa" and "Made in Cameroon" that are healthy and safe for customers by helping farmers complied to legal requirements, standards and technical rules.

☑ LinkedIn: Company Profile

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**Guy Bertrand Pouokam,
CEO of AGRITEK Consulting**

VIDEO: Presentation by Guy Bertrand Pouokam on digital agriculture in Cameroon

Mavuno Technologies

Country: Germany, founded in 2021

Mavuno Technologies leverages AgriTech to massively increase farming productivity and contribute to transitioning the market towards a global role model for agricultural production. With their solutions, they reduce risk, save time, optimize agricultural productions, increase reliability and efficiency whilst promoting sustainable agriculture.

Website: www.mavuno.tech

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Johannes Röhrenbach,
Co-founder & CEO

VIDEO: Presentation by Johannes Röhrenbach on empowering smallholder farmers

Use Cases: Support of business ideas in the use of digital applications in tropical agriculture

eMsika
Launched in 2016, eMsika is a Zambian agriculture technology company. They serve a multitude of buyers and suppliers across the continent.

Speaker: Gilbert Mwale, CEO

Marula Agribusiness B.V. / Marula Proteen Ltd.
Proteen is the first industrial black soldier fly production company in Kampala and it is rapidly scaling.

Speaker: Tommie Hooft van Huysduynen, Co-Founder

eMsika

Country: Zambia

eMsika is helping smallholder farmers procure farm inputs and learn how to farm as a business using digital platforms. They also provide a full value chain mobile payments and traceability software for Agribusinesses doing food aggregation.

Website: www.emsika.com

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Gilbert Mwale,
CEO

VIDEO: Presentation by Gilbert Mwale on bringing farming information to your fingertips.

Marula Agribusiness B.V. / Marula Proteen Ltd.

Country: Uganda

Proteen feeds urban organic-waste to Black Soldier Fly larvae. After a short rearing period these larvae can be harvested, dried and processed into high-quality protein feed for livestock production. The larvae leave behind an insect manure which is processed into a valuable organic fertilizer.

🔗 Website: https://weareproteen.com/

Tommie Hooft van Huysduynen, Co-Founder

VIDEO: Presentation by Tommie Hooft on creating CO2 negative value chains.

Use Cases: Traceability in agricultural supply chain

EXPRESS - University of Leipzig
Experimental field for data-driven networking and digitalization in crop production and special crops.

Speaker: Viola Süß, Research Assistant at University of Leipzig

Koa-Impact
Koa aims to spot hidden potential to empower people, and thereby contribute to sustainable growth in rural Ghana.

Speaker: Kwaku Owusu Twum, Digital Innovation & Technology Manager

Koltiva
Koltiva solves critical challenges in global supply chains, from increasing producers' livelihood, enhancing environmental protection, to improving trade transparency.

Speaker: Luca Fischer, Program Manager

Initiative for Sustainable Agricultural Supply Chains (INA)
INA is a program of GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit), the German Agency for International Cooperation.

Speaker: Anna Kühnel, Advisor at GIZ

EXPRESS

Country: Germany

In EXPRESS, scientists from various research institutes work together to test new technologies for plant cultivation - and to make collected findings publicly available.

Website: www.digitalisierung-landwirtschaft.de

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UNIVERSITÄT LEIPZIG

Viola Süß,
Research Assistant at
University of Leipzig

Transparent and traceable supply chains in fruit growing using Blockchain Technology

Viola Süß, business informatics graduate

15 February 2023 - Dialogue events on exemplary business models

UNIVERSITÄT LEIPZIG   TT FOOD THINK TANK FOOD

VIDEO: Presentation by Viola Süß on the usage of blockchain technology in agriculture

KOA

Country: Switzerland, Ghana

Koa was born from a sophisticated concept, innovative processes and a great deal of passion. They discovered that the cocoa fruit has much to offer besides the beans. It is able to increase farmers' income, create new jobs in rural areas, and is a resource for added value for the people and planet.

Website: https://koa-impact.com

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KOA TASTE YOUR IMPACT

Kwaku Owusu Twum,
Digital Innovation &
Technology Manager

The role of Transparent traceability towards Sustainable Agriculture – Koa's Blockchain System

Kwaku Owusu Twum, Digital Innovation & Technology Manager

15 February 2023 - Dialogue events on exemplary business models

KOA TASTE YOUR IMPACT   **TT FOOD** THINK TANK FOOD

VIDEO: Presentation by Kwaku Owusu Twum on Koa's Blockchain System

Koltiva

Country: Switzerland, Indonesia

Koltiva is a leading agritech company for enterprises to make their global supply chains traceable, inclusive, and climate-smart, backed by our human-centered technology with boots on the ground professional service.

Website: www.koltiva.com

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Luca Fischer,
Program Manager

VIDEO: Presentation by Luca Fischer on a case study of the palm oil sector

Initiative for Sustainable Agricultural Supply Chains

Country: Germany

The Initiative for Sustainable Agricultural Supply Chains (INA) is an association of players from within the private sector, civil society, and politics. They aim to achieve greater sustainability across global agricultural supply chains and improve the living conditions of smallholders.

🔗 Website: www.nachhaltige-agrarlieferketten.org

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Anna Kühnel,
Advisor at GIZ
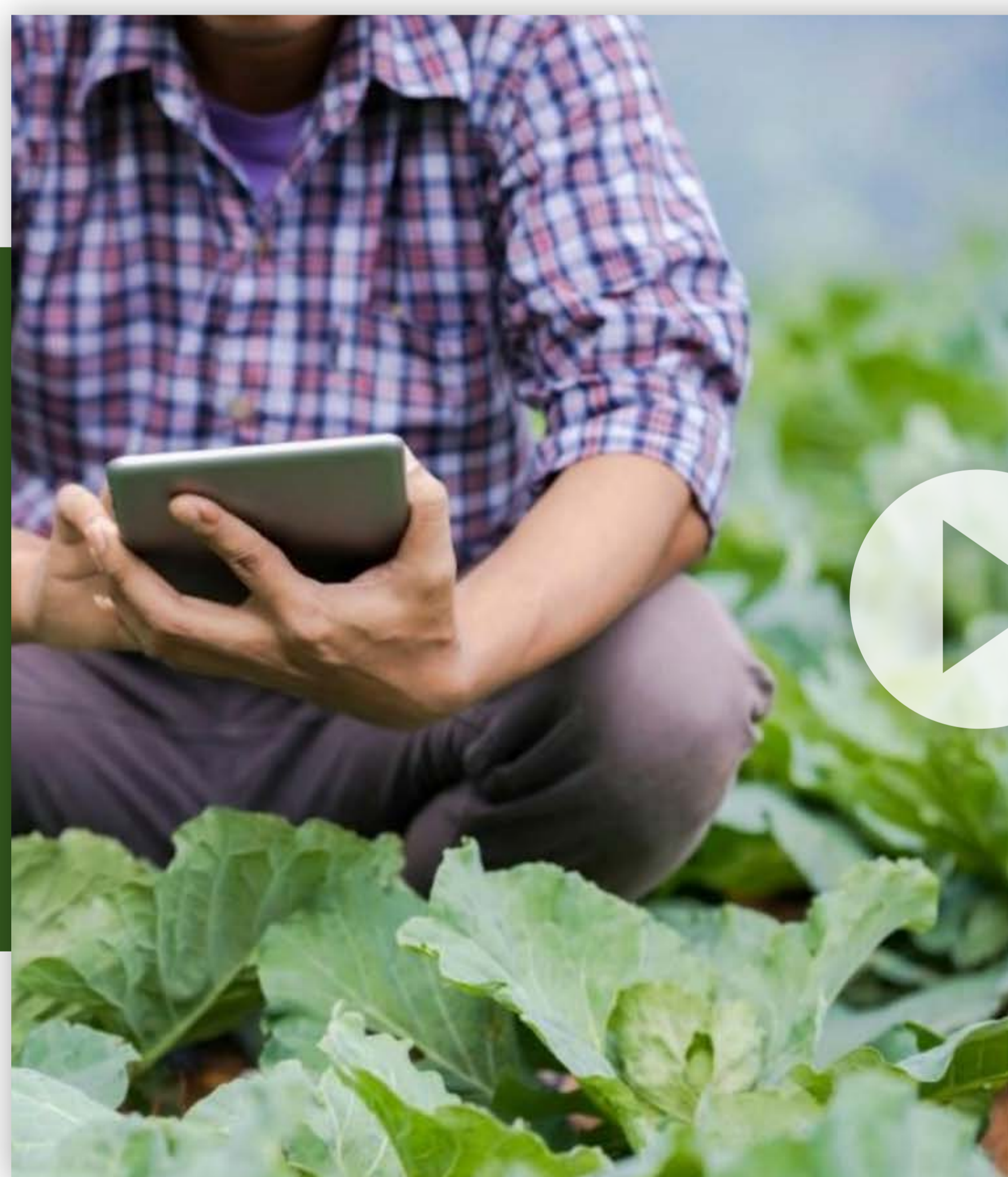
VIDEO: Presentation by Anna Kühnel on making supply chains transparent and fair

Project Transfer

TT-Food supports the transfer of knowledge into practical applications and the development of business ideas.

Road to Success

One of the objectives of the TT-Food program was to support the transfer of knowledge into the own practical environment through the development of business ideas.

Therefore, Steinbeis University, together with Bright&Bold, designed a structured process and introduced the participants to several entrepreneurial methodologies, and empowered them to shape and sharpen their ideas.

The process implemented by Bright&Bold was called the "Road to success" and was split into three phases:

1 **Expert seminars**
With the help of six expert seminars on digital technologies and their use cases in the field of tropical agriculture, the participants developed the competencies needed to find new ways and innovative solutions to impact the lives of smallholder farmers.

2 **Idea generation phase**
We started with the problem definition and idea generation at the end of each seminar. We identified the biggest problems farmers face in different African regions and developed ideas based on the technology input we have received before. We then worked with the teams in one-on-one meetings to further evolve these ideas, evaluate them, and turn them into a concrete business idea. In addition, we helped those who did not yet have a team to find team members.

3 **Business Plan and Pitch**
Seven projects were selected to move on to the next phase. The seven teams received three months of coaching to prepare their business plans and pitch decks. On the final demo day, the teams could present their business to an expert jury. They were either investors or experts in entrepreneurship. An international audience has been invited.

"The program has shown the immense potential for innovation within the agricultural industry. Collaborating with individuals from diverse countries who have unearthed their entrepreneurial spirit and delivered impressive results in a brief period was truly inspiring. Working with these teams was a pleasure, and I wish them all the best for their journey ahead."

Sarah Lorenz, Co-Founder and CEO at Bright&Bold

"TT-Food is a unique platform for budding entrepreneurs to get access to expertise, funding and mentorship for their project ideas. It was a great experience interacting with the entrepreneurs and helping them in nurturing their business ideas."

Dr. Rajesh Panda, Professor at the Xavier Institute of Management, XIM University
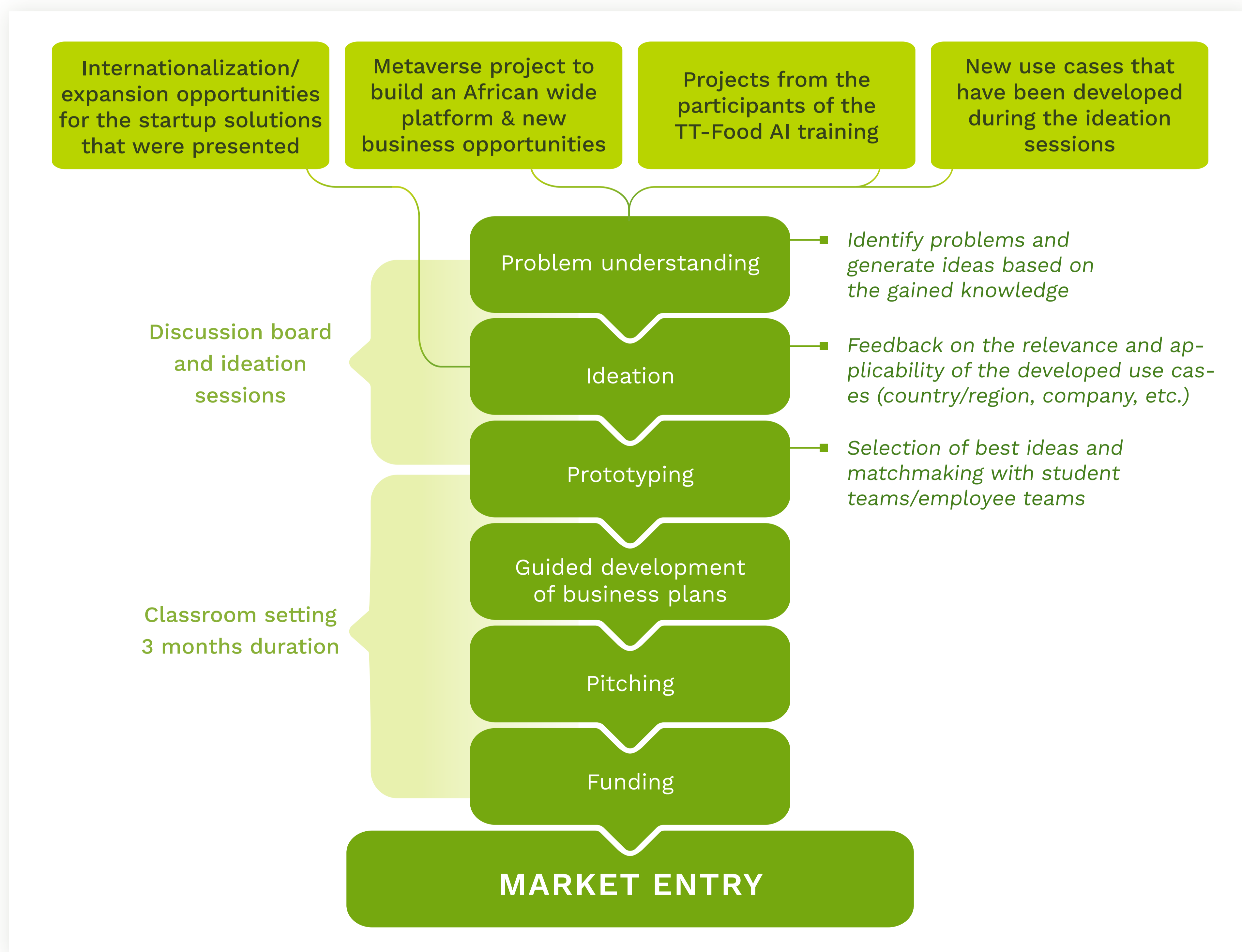
"Road to success" (Source: Bright&Bold)

Agro+ Bio-fertilizers

Agro⁺

In Côte d'Ivoire declining yields are caused by climate change, soil depletion due to overexploitation (Koné and al., 2010) and intensive use of chemical fertilizers (Ilg and al., 2005). Excessive use of chemical fertilizers leads to a decrease in nutrient use efficiency (Aulakh and Adhya, 2005). Poorly applied, they can reduce soil fertility by mobilizing organic colloids (Ilg and al., 2005).

Compost has been described as a sustainable solution to soil fertility problems (Gbakatchétché and al., 2010).
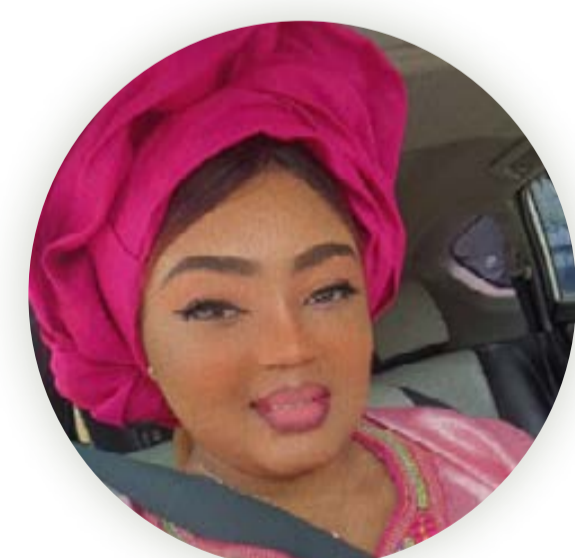
Our project aims to combine bacteria with organic residues to make bio-compost with lower coast.

Contact

Wondouet Hippolyte Kpan
Co-Founder
Agro+
kpanh@ymail.com

Buyam-Sellam

The size of the food and agriculture market in Africa will rise to $1 trillion by 2030, and improving the agro-commodity trading sector is one of the best strategies to achieve this. The significant challenges farmers, agro-commodity traders, and consumers face in Cameroon are limited access to markets and high marketing and sales cost. We propose an online marketplace (in the form of a web platform called and a mobile application) that connects farmers, intermediaries, retail traders, and consumers, providing access to a vast market and information and reducing transaction costs. Our revenue sources will be transaction fees (1.5 to 5% of the selling price), annual subscription fees ($30 annual fees), monetization of non-personal data and insight, trading, advertising & marketing ($50 annual fees), and trading. Our business project will be financially viable as, based on our seven year cash flow projections, we will start to make positive cash flows from the third year and be highly profitable from the fifth year.

Contact

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 +48574703169

CherryAtlas

CherryAtlas is a digital platform aimed at raising the cherry sector in Morocco by providing technical advice to cherry producers and facilitating their sales through an e-commerce platform. The platform will provide best practices for cultivation and offer customers a seamless buying experience. CherryAtlas will increase growers' revenue streams, reduce waste, and improve the quality and quantity of cherry production.

Contact

Amadou Moctar Fall
Engineering Student
National School of Agriculture of Meknes
LinkedIn

Eco Agri-tech solutions

The size of the food and agriculture market in Africa will rise to $1 trillion by 2030, but increasing the productivity of the farmers during the dry season through irrigation is one of the best strategies to achieve this. One of the significant challenges preventing small-holder vegetable farmers in Cameroon from growing crops on a large scale to satisfy the ever-growing demand for vegetables during the dry season is the need for irrigation technologies and the unsustainable use of water resources. We propose an efficient and sustainable smart irrigation system with regenerative farming that consists of an IoT system, irrigation systems, and regenerative farming management system (based on the regenerative farming principles, e.g., amour on the soil surface, maximization of Diversity, maximization of living roots on the soil, and minimization of soil disturbance). Our main sources of revenue will be from offering irrigation and infrastructure as a service (IIaaS), execution of irrigation projects, consultancy, and income from our demo farm. Our projections show that our business will start to yield positive cash flows from the third year but will break even by the end of the fourth year, and by the end of the fifth year upwards, it will be highly profitable.

Contact

Godlove Suila Kuaban
gkuaban@yahoo.com
+48574703169

Pump-based manual sprinkling irrigation of tomato crops

Integrated Aerial Precision - IAPrecision Internationalization and Expansion project

IAPrecision is an AgriTech company providing drone technologies and data analytics services to increase farmers' yields and profitability.

The project involved the development of an internationalization strategy to expand Integrated Aerial Precision's operations from Nigeria into Morocco.

The team achieved a feasible and executable internationalization strategy.

Contact

Femi Adekoya
Founder Integrated Aerial Precision
www.iaprecision.com
femi@iaprecision.com

Pheno_smart Irrigation Scheduler

This project aims to develop an Artificial Intelligence (AI) enabled smartphone application for smart irrigation scheduling. Techniques such as AI exist that could be used to model existing or/ and generated data to develop sustainable location-specific, real-time irrigation schedules without installing equipment on the field. The application of meteorological data, soil and plant morphological/ phenological data into a simple smartphone Application, "Pheno_smart Irrigation Scheduler (PIS) tool can enhance production and agricultural water management.

Contact

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Assistant Lecturer
University for Development Studies
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rdogbey@uds.edu.gh
LinkedIn

The Farmers' Kamarade

We are developing a decision support platform that will enable farmers to make production decisions in lesser time while assessing help from industry professionals for assistance. Our solution, coined the AI Value Chain Process Optimizer (AI-VPO), seeks to aid farmers in the choice of crops which will enable their household dietary needs while earning them income simultaneously. The AI-VPO platform is made up of five basic components all interacting to enable efficient resource use, land productivity and farmers profitability.

1. A Land suitability evaluator
2. A land planner/ land optimizer
3. A cropping calendar tracker
4. Remote advisory and market assistance services
5. A resource allocator and yield predictor

Contact

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Facts & Figures

Figures

Module 1

Expert seminars: 6

Speakers: 29 (8 keynote speaker & 24 use cases & 27 presenters of use cases)

Participants: 193 (without duplicates)

Different countries: 26 (12 African countries)

Module 2

Dialogue events: 3

Speakers: 21 (2 keynote speaker & 19 use cases & programs & 4 jury members)
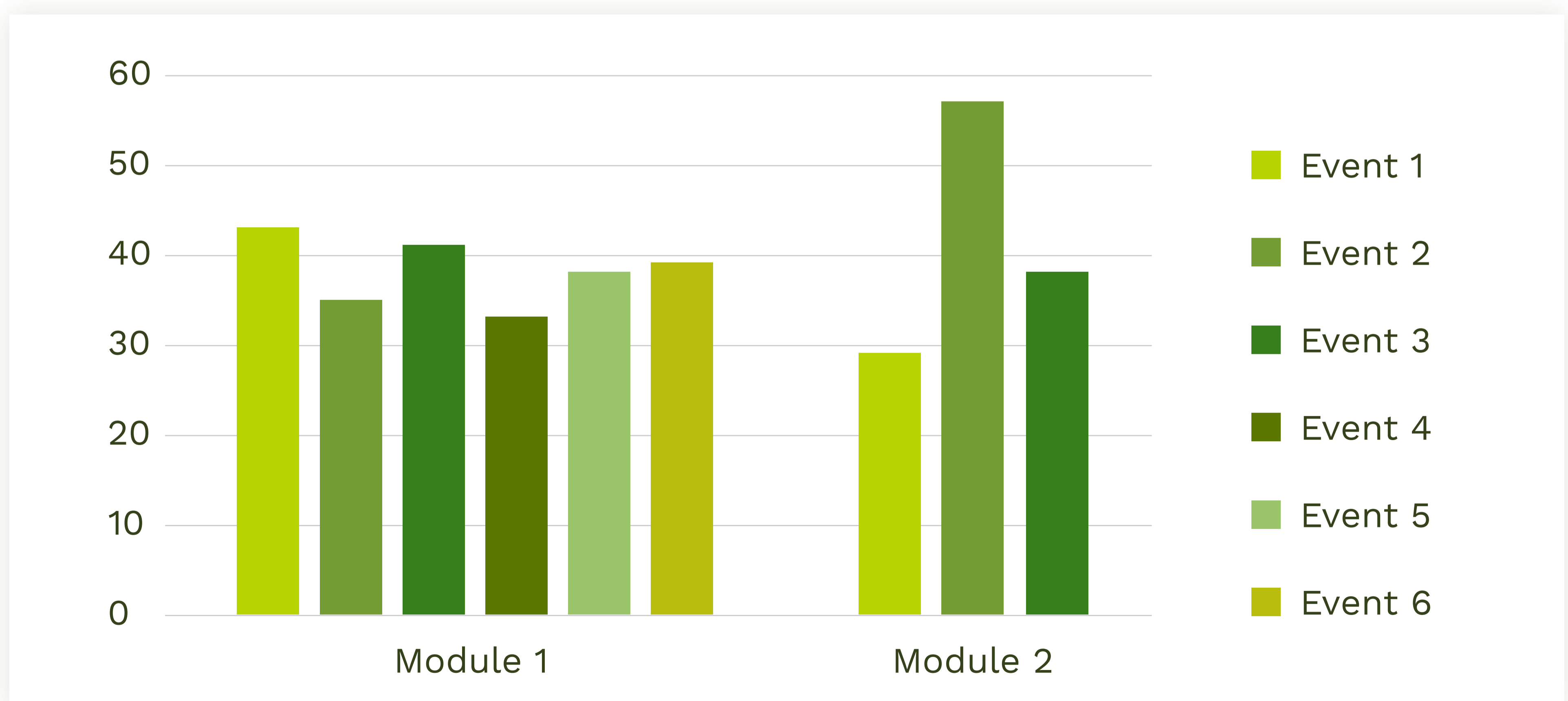
Participants: 107 (without duplicates)

Different countries: 23 (11 African countries)

Participants

Module 3

Artificial Intelligence in Agriculture online training

21 participants trained on AI in agriculture (9 successfully finished all 3 modules and received a certificate of participation)

- Group 1: 7 participants
- Group 2: 14 participants

Project transfer

29 project ideas

7 projects in development phase

3 matchmaking (project teams and interested contacts)

7 teams with

6 different nationalities (Cameroon, Ghana, Cote d'Ivoire, Morocco, Nigeria, Burkina Faso)

TT-Food Network

Networks / Platforms	Total
Seminars & events	276 Participants
TT-Food platform	60 Users (30.03.2023)
LinkedIn	370 Followers (30.03.2023)

Contact & Imprint

Contact & Imprint

The publication of this e-book was supported by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) as part of the Business Scout for Development programme of the German Federal Ministry for Economic Cooperation and Development (BMZ).

Think Tank Food (TT Food)

The project is led by Steinbeis University in cooperation with the Business Scouts for Development programme and the German Electro and Digital Industry Association (ZVEI e.V.). The Business Scouts programme is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ).

www.thinktank-food.com